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## Controller

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UBC53US

Dear Sirs:

## APPEAL

**This is an Appeal of the Examiner's rejection of the claims of this application.**

## Status of the Claims

All of claims 1 to 18 are currently under consideration. Claim 1 is the claim as amended in the response to the Office Action of June 14, 1993, i.e. the response received in the Office on August 2, 1993. Claims 1 to 15 inclusive are under rejection and claims 16 to 18 inclusive have been indicated as allowable if rewritten in independent form and if the rejection under U.S.C. § 112 is removed (it is believed the U.S.C. § 112 rejection was included in error as this objection was whited out in the First Office Action has been overcome, was only included, but not defined, in the Final Action).

## Status of Amendments

All of the amendments have been entered. The last response concentrated on a discussion of the basis for the rejection, on the teachings of the references and why in Applicant's opinion the combination of references could not be made based on a fair reading of the References without Applicant's disclosure in hand.

## Summary of the Invention

The invention is directed to a simple yet effective system for moving or applying

forces to a platform in two degrees of freedom (DOF) relative to a base. The present invention employs a first magnetic force generator for generating forces in one direction on the platform and a second force generator for generating forces of a second direction. Normally, the first and second directions will be mutually perpendicular. Each of the two force generators comprises a cooperating or interacting pair formed by a magnet and a cooperating coil, one mounted on the base and the other on the platform. One of each of the pairs (magnet or coil) are in fixed relationship to each other on the base and the other of each of the pair (magnet or coil) are mounted in fixed relationship to each other on the platform. In the illustrated arrangement, the coils are fixed to the platform in a specific fixed relationship and the magnets are fixed to the base in a specific fixed relationship. This construction provides a two DOF platform that is simple to construct, very robust and since the forces required to move the platform in either of the selected directions is the same permits operation using a relatively simple computer control system (to Applicant's knowledge on other system provides the later advantage).

In the specific construction of the invention one half of each of the drives (coil or magnet) for each of the different directions is fixed to the base, and the other is fixed to the platform. The force required to displace the platform in either directions is substantial. In other devices (unless complicated mechanisms are used which contribute friction, flexing dynamics and other problems) the force required to move the platform in one direction is different from the force required to move the platform in the other direction. In most devices one cooperating pair (first force generator) moves an intermediate device and the platform in one direction relative to the base and the second cooperating pair (second force generator) move only the platform relative to the intermediate device and thus to the base.

The system of the present invention wherein the same amount of force is required for an equivalent movement in each of the two directions provides a very significant advantage over the prior art, as both in the control system required and in the device overall system are simplified.

#### **Issues**

It is the Patent Office's contention that the claimed invention is obvious over the combination of Clark in view of Cadoz. The Examiner maintains that it is obvious to apply the teachings of Cadoz to the teachings of Clark.

It is the Applicant's position that:

- a. one skilled in the art with both Clark and Cadoz before him would not know that the problem solved by Applicant even existed.
- b. one skilled in the art would never combine the teaching of Clark and Cadoz based on the teaching of the prior art and in particular of these references i.e. the two references could not logically be combined based on their teachings alone;
- c. the Examiner's interpretation of what is taught in Cadoz is incorrect; and
- d. even if teaching of Cadoz were applied to the teachings of Clark, i.e. to manipulate the belt of Clark, based on the references belt could only be manipulated by applying the system taught by Cadoz which clearly would not result in applicants invention as taught in the disclosure and defined in the claims.
- e. none of the references taken alone or combined attain the advantages of the present invention.

#### **Grouping of the Claims**

Claims 1 to 15 inclusive have been rejected under 35 U.S.C. § 103. Claims 16 to 18 inclusive have been allowed provided they were rewritten in independent form.

#### **Arguments**

Applicant believes that the basis of the rejection is faulty in that:

1. It is based on the misinterpretation of the teachings of the references.
2. It is based on a combination of references that is not justifiable based on the teachings of the references without the benefit of Applicant's teachings.
3. It is based on two references using arguments that ignore some of the principal statements and structural requirements in the references (particularly in Cadoz) and a fabricated structure that is not in Applicant's opinion based on a fair interpretation of the teachings of the art.
4. It is based on simple statements that "it is obvious" with no indication why it would be obvious from the references per se ie without Applicant's disclosure.

The Clark et al. reference, it is believed, has been cited to show a platform that is movable in two directions. Applicant does not content to be the first to have invented a platform movable in two directions substantially any gantry structure does this. Thus, the Clark et al. reference does not provide any significant teaching.

Briefly, Clark shows a base having a flexible belt wrapped around it, the belt is

manually moved relative to the base by rotation of the belt about the base or axial (relative to the rotational axis of the belt) movement relative to the base, i.e. it can be moved in two mutually perpendicular directions.

The belt of Clark is manually moved. There are no force generating means moving it and certainly no means for applying specific movement only in one direction and a second means moving the belt only in another direction. Clark simply manually moves the belt, senses the position of the belt (or displacement of the belt in two directions) and based on the sensed position or displacement controls another operation.

There is nothing in this patent that would even remotely suggest combining the teachings of this patent with those of Cadoz et al.

Cadoz et al. is primarily directed to a keyboard structure incorporating magnets and individually slidably mounted cooperating coils, structured so that movement of the keys moves the coils or alternatively, the keys are moved by activating the coils.

In the Cadoz et al. structure all the magnets are mounted in fixed relationship on the base i.e, each of the magnets for each of the keys is fixed to the base. On the other hand each cooperating coil is mounted for movement totally independent of the movement of other coils in the structure. Each coil is mounted on the base for independent slidable reciprocal movement parallel to the other coils on the base i.e. **there is no fixed relationship between the coils of the Cadoz et al device.** Thus, in Cadoz et al. there are ~~no~~

**a) are no coils mounted on a platform, and**

**b) is no fixed relationship between the coils on the platform of base,**  
yet, both a) and b) are fundamental requirements or essentials to the present invention and are found in neither Clark nor Cadoz et al.

The claimed invention has been divided into parts 1 to 10 inclusive as follows:  
"A controller comprising

- 1 a base,
- 2 a platform,
- 3 means for mounting said platform for a range of movement in a plane in each of two different directions,
- 4 a first magnetic force applying means including
  - 4A a first magnet means mounted on said base and

- 4B a first cooperating magnetic force generating means mounted on and moveable with said platform in position to interact with said first magnet means,
- 5. a second magnetic force applying means including
  - 5A a second magnet means mounted on said base and
  - 5B a second cooperating magnetic force generating means mounted on and moveable with said platform in a position to interact with said second magnet means,
- 6. said first and said second magnet means being fixed relative to each other on said base and
- 7 said first and said second cooperating magnet force generating means being fixed relative to each other on said platform,
- 8. said first force applying means being positioned and constructed to controllably apply selected forces to said platform in one of said two different directions and
- 9. said second force applying means being constructed and positioned to controllably apply selected forces to said platform in the other of said two different directions
- 10. and control means to selectively control said first and said second force applying means to generate said selected forces."

(numbering and paragraph separation of the elements have been added to claim 1)

It will be apparent that fixing of the coil (or magnets) to the platform so that they are in fixed relative position at all time is clearly defined in paragraph 7 and the fixed relationship of the magnets (or coils) to the base (and therefor to themselves) is defined in paragraph 6.

Since this fundamental requirement of the present invention defined in paragraph 6 and 7 is clearly claimed and is not seen in nor taught by nor obvious from either the Cadoz et al. reference the Clark et al. reference or the combined teaching of both, it is submitted that the rejections of the claim are not based on a solid grounds and that the application should be allowed.

The rejection relies heavily on the argument based on the interpretation of column 7, line 4-6 of Cadoz et al. that states

**"In case where it is the rod that actuates the key, it can be used for simulating the behaviour of a joystick with two degrees of freedom".**

Applicant can see no teaching in this statement describing fixing the coils to the platform and the magnets to the base or vice versa. In fact, the teachings of Cadoz, if the above statement is read in context, are the exact opposite. The rejection states that

**"when a movement with two degrees of freedom being simulated, it would have been obvious to include a second magnetic force applying means which included a second magnet means and a second magnetic force generating means in the teaching of Cadoz so that the movement in a second direction which is different from the first direction i.e. x and y directions can be simulated according to Cadoz' suggestion."**

The above statement of the Examiner attempts to take the simple statement of Cadoz **"simulating the behaviour of a joystick in two degrees of freedom"** and converts it into a specific structure that the Examiner believes follows from the teaching of Cadoz. It is submitted this is not a reasonable interpretation of the reference based on the reference and the existing prior art i.e without Applicant's teaching.

The above statement of Cadoz

**"In case where it is the rod that actuates the key, it can be used for simulating the behaviour of a joystick with two degrees of freedom".**

appears in context in the middle of a description relating to Figure 8 wherein two independently movable members 80-1 and 80-2 are used to reposition the center of an arc on which the arm 82 carrying the arm 90 on which the end point 92 is mounted. Thus, any movement in the center of an arc results in an actuate movement of the end point about this center not movement in a first specific direction or in a second specific direction, which in some claims is further defined as the first and second directions being mutually perpendicular.

In all cases, the movements of the coils 80-1 and 80-2 are in parallel directions, not two different directions as required by the claim and as essential to the operation of the present invention.

If the Examiner is attempting to interpret "two degrees of freedom" statement is implying that each of the motors of Cadoz's defines a degree of freedom, this is not true if one considers degrees of freedom as having two different directions. In every embodiment of Cadoz all the motors (coils) in Cadoz move in the same direction. It is only by providing a specific linkage between a set of motors that Cadoz can obtain

movement of the end point in two different directions.

Based on the teachings of Cadoz, it is not clear how one may logically conclude that it would be obvious that the first and second magnetic force applying means of Cadoz could be applied to the device of Clark. It is even less clear how one could logically determine how they would be applied (if for some reason it was decided they should be applied). Furthermore there is no teaching anywhere except in the instant application that the first and second magnet means must or should be positioned fixed relative to each other on the base and the first and second cooperating magnet means should or could be positioned fixedly relative to each other on the platform.

Cadoz fixed the magnetic means on the base but coils are all free to move (reciprocate) relative to each other and to the base. Both the coils and the magnets are mounted on the base in Cadoz, the magnets fixed to the base and the coils slidable relative to the base. If the coils were also mounted in fixed relationship the device of Cadoz would be inoperative.

If one, for unknown reasons based on the references, were to apply the Cadoz et al. two degrees of freedom joystick to Clark's belt it is believed more logical to conclude one would apply the structure as defined by Cadoz et al. for obtaining the two degrees of freedom and thus the combination would include the lever mechanisms and connect the lever or the end point of Cadoz to the platform (belt) of Clark not the system described by the Examiner.

Any attempt to apply the Cadoz et al. teachings to Clark and simulate the present invention, first requires total restructuring of Cadoz in a manner not contemplated by Cadoz and then applying this restructured or fabricated arrangement to the platform or belt of Clark et al. in a particular manner not suggested or even dreamed of by Clark or by Cadoz.

No where in either of these references is there any suggestions whatsoever that it would be desirable to combine their teachings and no where can one find, in the teachings of these references, the concept of the relatively simple structure of applicant's invention wherein the coils are fixed to the platform and thus, are fixed relationship to one another and the magnets are fixed on the base, again in fixed relationship to one another so that no lever mechanisms whatsoever are required to obtain the two degree of freedom movement and further wherein the force necessary to move the platform in

one direction is essentially the same as the force required to move the platform in the other direction.

It is Applicant's position based on the above that:

- a. There is nothing in the teachings of these references, that would lead one skilled art to combining the teachings of Clark and Cadoz.
- b. There is nothing in the teachings of either of reference that would suggest the concept of fixing the coils to the platform in fixed spaced relationship and fixing the magnets to the base in fixed relationship so that the forces required to move the platform in any direction are substantially the same, i.e. provide a system where the weight to moved when the platform is moved in one direction is the weight to be moved when the platform is to be moved in the other direction as with the prior art concepts
- c. Applicant's system does not require separate levers to drive a platform in two degree of freedom movement while the prior art does.
- d. If one were to combine the two references, one would combine them based on the inherent teachings of these references so that both the magnets and the coils would be mounted on the base, the coils would be relatively moveable and a set of linkages would be used to connect with the platform or belt in the same manner as taught by Cadoz et al. Obviously, this structure has no relationship whatsoever to Applicant's claimed invention.

It is Applicant's understanding, based on the case law, that to combine references, the prior art itself must provide some suggestion of the desirability of making the invention; see *Ryko Manufacturing Co. vs Nu-Star Inc.* 21 USPQ 2d at 1057 or *Interconned Planning Corp. vs Feil* 774 F. 2d 1132,1143: 227 USPQ 543,551 - Fed Circuit 1985. Certainly, nothing in the prior art cited would lead one towards the present invention.

It is also Applicant's understanding, and the function or purpose of the components of the invention found in the prior art, the problem solved by them should be the same as the invention under consideration for there to be reasonable grounds to make the combination.

*Dow Chemical Co.* 837 F. 2d 469, Federal Circuit, stated

"The consistent criteria for the determination of obviousness is whether the



prior art would have suggest to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art.... Both the suggestion and the expectation of success must be found in the prior art, not in Applicant's disclosure.

The cited prior art does not, it is submitted, meet these tests or criteria required for a proper combination of references to find obviousness. There is nothing in the prior art to suggest the present invention. There is nothing in the prior art to suggest the combination made by the Examiner should be made or would likely be successful if made. Furthermore if the prior art reconstructed based on a combination of the teachings of the two references the present invention would as described and claimed not be produced for reasons given above.

It is believed that this application is in condition for allowance and such action is respectfully requested.

Respectfully submitted,



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Date: February 19, 1994

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**Claims Being Prosecuted**

1 (Amended) A controller comprising a base, a platform, means for mounting said platform for a range of movement in a plane in each of two different directions, a first magnetic force applying means including a first magnet means mounted on said base and a first cooperating magnetic force generating means mounted on and moveable with said platform in position to interact with said first magnet means, a second magnetic force applying means including a second magnet means mounted on said base and a second cooperating magnetic force generating means mounted on and moveable with said platform in a position to interact with said second magnet means, said first and said second magnet means being fixed relative to each other on said base and said first and said second cooperating magnet force generating means being fixed relative to each other on said platform, said first force applying means being positioned and constructed to controllably apply selected forces to said platform in one of said two different directions and said second force applying means being constructed and positioned to controllably apply selected forces to said platform in the other of said two different directions and control means to selectively control said first and said second force applying means to generate said selected forces.

2. A controller as defined in claim 1 wherein said two directions are mutually perpendicular.

3. A controller as defined in claim 1 further comprising a sensor means for sensing the position of said platform relative to said base.

4. A controller as defined in claim 3 wherein said sensor means comprises a transparent grid mounted on and moveable with said platform and a light source and a detector means fixed relative to said base in positions wherein light from said source passes through said grid and is detected by said detector means

5. A controller as defined in claim 2 further comprising a sensor means for sensing the position of said platform relative to said base.

6. A controller as defined in claim 5 wherein said sensor means comprises a transparent grid mounted on and moveable with said platform and a light source and a detector means fixed relative to said base in positions wherein light from said source passes through said grid and is detected by said detector means

7. A controller as defined in claim 2 wherein said first cooperating magnet force

generating means including a first coil means position to interact with said first magnet means when a current is applied to said first coil means, and said second magnetic force generating means including a second cooperating coil means in a position to interact with said second magnet means when a current is applied to said second coil means, said first magnet means and said first cooperating coil means of said first force applying means being shaped and positioned so that in any position of said platform within said range said coil may be controlled to apply said selected forces between each of said first and second cooperating coil means and its respective magnet means and wherein said control means selectively applies current to said first and said second cooperating coil means to generate said selected forces.

8. A controller as defined in claim 7 wherein the projected area of a field generated by said first magnet means onto said first cooperating coil means is substantially constant so that the application of a selected current to said first cooperating coil means generates the same force between said first magnet means and said first cooperating coil means regardless of the position of said platform within said range of movement, said second magnet means and said second cooperating coil means of said second force applying means being shaped and positioned so that in any position of said platform within said range the projected area of a field generated by said second magnet means onto said second cooperating coil means is substantially constant so that the application of a selected current to said second cooperating coil means generates the same force between said second magnet means and said second cooperating coil means regardless of the position of said platform within said range.

9. A controller as defined in claim 8 wherein said first cooperating coil means comprises a first elongated substantially planar coil having its major axis extending substantially parallel to said plane and to one of said pair of mutually perpendicular directions and said second cooperating coil means comprises a second elongated substantially planar coil having its major axis substantially parallel to said plane and said other of said mutually perpendicular directions.

10. A controller as defined in claim 5 wherein said first cooperating magnet force generating means including a first coil means position to interact with said first magnet means when a current is applied to said first coil means, and said second magnetic force generating means including a second cooperating coil means in a position to interact with

said second magnet means when a current is applied to said second coil means, said first magnet means and said first cooperating coil means of said first force applying means being shaped and positioned so that in any position of said platform within said range said coil may be controlled to apply said selected forces between each of said first and second cooperating coil means and its respective magnet means and wherein said control means selectively applies current to said first and said second cooperating coil means to generate said selected forces.

11. A controller as defined in claim 10 wherein the projected area of a field generated by said first magnet means onto said first cooperating coil means is substantially constant so that the application of a selected current to said first cooperating coil means generates the same force between said first magnet means and said first cooperating coil means regardless of the position of said platform within said range of movement, said second magnet means and said second cooperating coil means of said second force applying means being shaped and positioned so that in any position of said platform within said range the projected area of a field generated by said second magnet means onto said second cooperating coil means is substantially constant so that the application of a selected current to said second cooperating coil means generates the same force between said second magnet means and said second cooperating coil means regardless of the position of said platform within said range.

12. A controller as defined in claim 11 wherein said first cooperating coil means comprises a first elongated substantially planar coil having its major axis extending substantially parallel to said plane and to one of said pair of mutually perpendicular directions and said second cooperating coil means comprises a second elongated substantially planar coil having its major axis substantially parallel to said plane and said other of said mutually perpendicular directions.

13. A controller as defined in claim 6 wherein said first cooperating magnet force generating means including a first coil means position to interact with said first magnet means when a current is applied to said first coil means, and said second magnetic force generating means including a second cooperating coil means in a position to interact with said second magnet means when a current is applied to said second coil means, said first magnet means and said first cooperating coil means of said first force applying means being shaped and positioned so that in any position of said platform within said range

said coil may be controlled to apply said selected forces between each of said first and second cooperating coil means and its respective magnet means and wherein said control means selectively applies current to said first and said second cooperating coil means to generate said selected forces.

14. A controller as defined in claim 13 wherein the projected area of a field generated by said first magnet means onto said first cooperating coil means is substantially constant so that the application of a selected current to said first cooperating coil means generates the same force between said first magnet means and said first cooperating coil means regardless of the position of said platform within said range of movement, said second magnet means and said second cooperating coil means of said second force applying means being shaped and positioned so that in any position of said platform within said range the projected area of a field generated by said second magnet means onto said second cooperating coil means is substantially constant so that the application of a selected current to said second cooperating coil means generates the same force between said second magnet means and said second cooperating coil means regardless of the position of said platform within said range.

15. A controller as defined in claim 14 wherein said first cooperating coil means comprises a first elongated substantially planar coil having its major axis extending substantially parallel to said plane and to one of said pair of mutually perpendicular directions and said second cooperating coil means comprises a second elongated substantially planar coil having its major axis substantially parallel to said plane and said other of said mutually perpendicular directions.

16. A controller as defined in claim 9 wherein said first magnet means and said second magnet means each comprises a pair of permanent magnet means, one permanent magnet means of each said pair located on one side of its said cooperating coil means and the other permanent magnet means of each said pair of permanent magnet means located on the side of its said cooperating coil means opposite its respective said one permanent magnet means.

17. A controller as defined in claim 16 wherein each said permanent magnet means comprises a pair of permanent magnets arranged in spaced parallel relationship with their magnetic poles facing in opposite directions and with their polar axes substantially parallel to the plane of said planar coils.

18. A controller as defined in claim 17 wherein said polar axis of each said permanent magnet means is substantially parallel to said major axis of its respective cooperating planar coil.



Ap. 269

In the United States Patent Office

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Inventor:

Salcudean, T.

Art Unit:

2609

Examiner:

Chang, V.

My File:

UBC53US

The Commissioner of Patents  
and Trademarks  
Washington, D.C. 20231

2-1357  
AD

Dear Sirs:

Appeal

Enclosed is three copies of applicant's Appeal Brief setting forth the reason it is believed that this application should be allowed

Please deduct the fee (Fee Code 220 37CFR 1.17(f)) in the amount of \$135.00 from my account no. 18 2150.

Respectfully submitted,

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